

MMHCC Newsletter November 2005

MouseLine

Integrating Nanotechnology in Cancer Research

(Excerpts from NCI's Cancer Bulletin, Oct. 18, 2005)

Dr. Anna Barker, guest update)



During the last few weeks, we announced funding for three major components of the National Cancer Institute's (NCI's) Alliance for Nanotechnology in Cancer. These awards, which represent key milestones in NCI's Cancer Nanotechnology Plan, reflect the product of intense community planning and a long-term commitment to employ nanotechnology as a transformational force in cancer research.

All told, these components represent a comprehensive, national initiative designed to accelerate the application of nanotechnology's unique capabilities to cancer. We congratulate these investigator teams and their institutions for their vision and leadership. The recent announcements include funding for:

- Centers of Cancer Nanotechnology Excellence that will develop new, nanotechnology-based diagnostic and treatment tools;
- Training programs that will establish a cadre of scientists with the cross-disciplinary expertise needed to develop the nanotech-based tools of the future; and,
- Investigator teams that will create new "platform" nanotechnologies to enhance discovery and translational research.

A fourth component is the Nanotechnology Characterization Laboratory (NCL) based at NCI-Frederick. In collaboration with the National Institute of Standards and Technology and the U.S. Food and Drug Administration, NCL establishes standard analytical methods and data to assess nanoparticle interactions with biological systems, thereby informing medical product development.

With these awards, we will establish a pathway for cancer nanotechnology career development. The Ruth L. Kirschstein National Research Service Awards training program will support postdoctoral and mid-career training. In addition, our partnership with the National Science Foundation and its highly successful Integrative Graduate Education Research Traineeship Program will provide funding to train graduate-level investigators in multidisciplinary areas such as biological, computational, and materials sciences.

The Alliance for Nanotechnology in Cancer builds on innovative technology platforms previously funded through the Unconventional Innovations Program. An example of an advanced technology, multifunctional nanoparticles capable of targeting vascular cells, drug delivery, and biosensing, will soon enter clinical trials. Dendrimer technologies have been applied in animal cancer models to simultaneously detect early stage tumors, deliver chemotherapeutic agents, and selectively kill targeted cancer cells. Quantum dots and molecular beacons are being used in many basic research laboratories to study dynamic interactions of novel therapeutics with their molecular targets. Nanowires and nanocantilevers are being prototyped for simultaneous detection of genes and proteins as molecular signatures of cancer in serum and tissue samples.

To learn about the latest advances and news in the NCI Alliance for Nanotechnology in Cancer and nanotechnology-related cancer research, please visit our website at <http://nano.cancer.gov>.



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Interferon-Efficacy Verified in Murine Lung Cancer Model

While non-small cell lung carcinoma (NSCLC) is the number one cancer killer in much of the world, current therapies are very suboptimal. In the September 15 issue of *Cancer Research*, Wilderman et al. reported that they have used a recently developed transgenic orthotopic model of bronchogenic adenocarcinoma of the lung to evaluate the effects of an adenovirus expressing interferon. Two intrapulmonary doses of vector were well tolerated and led to markedly increased survival of tumor-bearing mice. Efficacy was due to direct anti-tumor effects in combination with stimulation of NK cell activity and generation of CD8 cytotoxic T-cells.

Source: AACR Breaking News, September 30, 2005

For more information see: [Cancer Res. 2005 Sep 15; 65\(18\):8379-87.](#)

Hitchhiking Viruses Battle Cancer in Mice

While gene therapy originally showed great promise for cancer treatment, the difficulty in delivering therapeutic genes to the growing tumor has hamstrung this technique. Now, a team from the Mayo Clinic reports that hitchhikers can help. By attaching these genetically modified viruses to immune T cells, the team obliterated tumors in mice.

"We use immune cells to home in on the tumors," said Dr. Richard Vile, lead author on the paper published September 18 in *Nature Medicine* online. "There they can deliver whatever therapeutic genes we want."

Dr. Vile explained that as the body defends itself against a growing tumor, T cells begin to recognize and target cancer cells. Ideally, clinicians could remove these cells from the blood, attach beneficial viruses, and return hundreds of thousands of the hitchhiker-rich T cells to the patient.

As a proof of concept, the team generated T cells designed to home in on a particular type of laboratory-grown mouse tumor similar to melanoma. They then attached a variety of viruses to the T cells and returned the cells to the mice. Between 5 and 14 percent of the injected T cells homed in on the tumors, a rate that Dr. Vile described as "very promising." All of the mice receiving hitchhiker viruses engineered to produce interleukin-12 - a growth factor that boosts the immune system - were cured of their tumors.

Because the viruses ride into the tumor on immune system cells, they enjoy a "privileged status" that prevents them from being recognized and destroyed by other immune cells.

Source: NCI Cancer Bulletin 10/04/2005

For more information see: [Nat Med. 2005 Oct;11\(10\):1073-81](#)



Meetings

November 14 - 18, 2005

AACR-NCI-EORTC International Conference

"Molecular Targets and Cancer Therapeutics: Discovery, Development and Clinical Applications"
Philadelphia, Pennsylvania

Meeting information: <http://www.aacr.org/page4255.aspx>

Please stop by the Mouse Models of Human Cancers Consortium's exhibit booth. Our booth number is 348.

November 16 - 17, 2005

Cambridge's Healthtech Institute's Second Annual In Vivo Molecular Imaging

La Jolla, California

Meeting information: <http://www.healthtech.com/2005/img/index.asp>

December 10 - 14, 2005

45th Annual Meeting of the American Society for Cell Biology

San Francisco, California

Meeting information: <http://www.ascb.org/meetings/am2005/index.html>

Funding Opportunities

Environmental Influences on Epigenetic Regulation

RFA-ES-05-007

National Institute of Environmental Health Sciences

National Cancer Institute

Application Receipt Date(s): January 18, 2006

<http://grants.nih.gov/grants/guide/rfa-files/RFA-ES-05-007.html>

Development of PET and SPECT Ligands for Brain Imaging (SBIR [R43/R44])

PA-06-017

NIMH, NIA, NIDA, NIDCD, NINDS

<http://grants.nih.gov/grants/guide/pa-files/PA-06-017.html>

<http://grants.nih.gov/grants/guide/pa-files/PA-06-018.html>



Funding Opportunities cont.

Notice of Intent to Publish a Request for Applications (RFA) for Advanced Proteomic Platforms, Analytical Methods, and Computational Sciences for the Clinical Proteomic Technologies Initiative

NOT-CA-05-030

National Cancer Institute

<http://grants.nih.gov/grants/guide/notice-files/NOT-CA-05-030.html>

Notice of Intent to Publish a Request for Applications (RFA) for the Clinical Proteomic Technology Assessment Consortia for the Clinical Proteomic Technologies Initiative

NOT-CA-05-029

National Cancer Institute

<http://grants.nih.gov/grants/guide/notice-files/NOT-CA-05-029.html>

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